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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/888,762	06/25/2001	Yonina C. Eldar	0492611-0395(MIT 9170)	9398

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EXAMINER	
BURD, KEVIN MICHAEL	
ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 08/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/888,762	ELDAR ET AL.	
	Examiner	Art Unit	
	Kevin M. Burd	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. This office action, in response to the remarks filed 6/10/2005, is a non-final office action.

Response to Arguments

2. This office action is made non-final. A new rejection of the claims using the previously cited prior art is stated below properly addressing the claimed limitations.

3. Applicant's arguments filed 6/10/2005 have been fully considered but they are not persuasive. Bottomley discloses figure 3 shows a plurality of users and their corresponding spreading and scrambling signals make up the transmitted composite signal. The spreading code is user specific and the scrambling signal is group specific. These signals comprise the set of signature signals. Bottomley also discloses the bank of correlators outputs signals to a correlation shaper comprising elements 420a, 420b and 450, which shapes the signal by combining the correlator outputs and compensating for channel distortion (column 6, line 40 to column 7, line 5). The bank of correlators outputs a matrix or vector of correlation values that indicate the level of correlation to each of the desired spreading sequences s_d (column 6, lines 31-39). These elements do constitute the correlation shaper set forth in the claims.

Regarding the discussion of claims 4-6, 9-11, 27-30, 33 and 34, the combination of Bottomley and Huang discloses minimizing the mean square error of correlation output signals in a correlation shaper as stated in the previous office action and stated below.

Regarding the discussion of claims 7, 8, 12, 13, 31, 32, 35 and 36, Bottomley discloses the bank of correlators and correlation shaper as stated above. Heikkila discloses element 30 shapes the output of the demodulator by minimizing the Mean Square Error (paragraph 0033) that utilizes the rows of covariance matrix as stated in the abstract.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 14-27 and 37-48 are rejected under 35 U.S.C. 102(e) as being anticipated by Bottomley et al (US 6,801,565).

Regarding claims 1 and 2, Bottomley discloses a receiver shown in figure 4 comprising a bank or plurality of correlators 414a-414l and a method of using the correlators described in column 6, lines 22-39. The receiver receives a composite signal r(t) from the communication medium (column 6, lines 22-31). Figure 3 shows a plurality of users and their corresponding spreading and scrambling signals. These signals make up the transmitted composite signal. The spreading code is user specific and the scrambling signal is group specific. These signals comprise the set of signature signals.

The composite signal transmitted from the transmitter of figure 3 will undergo distortion in the communication medium prior to being received by the receiver of figure 4. The bank of correlators outputs signals to a correlation shaper comprising elements 420a, 420b and 450, which shapes the signal by combining the correlator outputs and compensating for channel distortion (column 6, line 40 to column 7, line 5). The bank of correlators outputs a matrix or vector of correlation values that indicate the level of correlation to each of the desired spreading sequences s_d (column 6, lines 31-39).

Regarding claims 14-25, 27 and 37-48, Bottomley discloses using orthogonal spreading codes to spread the transmitted signals (column 9, lines 56-58). Therefore, orthogonal spreading codes will be used in the correlators of the receiver (figure 4). Least Mean Squares (LMS) techniques are used to remove errors from the decorrelated signals (column 14, lines 10-35).

Regarding claim 26, the output of the correlation shaper is fed to downstream elements that detect and forward or process the received signal.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley et al (US 6,801,565) in view of the instant application's disclosed prior art (specifically paragraph 0004).

Regarding claim 3, Bottomley discloses the apparatus and method described in paragraph 4. Bottomley does not disclose the correlators are a matched filter receiver. However, the instant application's disclosed prior art discloses, in paragraph 0004, CDMA receivers use matched filter receivers that try to mitigate the effect of multiple signature signal interference and background noise. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to use the matched filter receiver of the instant application's prior art in the bank of correlators of Bottomley.

6. Claims 4-6, 9-11, 27-30, 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley et al (US 6,801,565) in view of Huang et al (US 6,067,292).

Regarding claims 4-6, 9-11, 28-30, 33 and 34, Bottomley discloses the apparatus and method described in paragraph 4. Bottomley does not disclose shaping the correlation by minimizing the mean square error. Huang discloses in column 20, lines 14-17, the output of the processed received signal is processed again to minimize the mean square error of the demodulated CDMA signal. This minimizing of the mean square error takes place in a "correlation shaper". It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the teachings of Huang into the apparatus and method of Bottomley. By minimizing the mean squared error,

performance of the receiver and the interference cancellation system can be improved (column 14, lines 46-54).

6. Claims 7, 8, 12, 13, 31, 32, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley et al (US 6,801,565) in view of Heikkila (US 2002/0122470).

Regarding claims 7, 8, 12, 13, 31, 32, 35 and 36, Bottomley discloses the apparatus and method described in paragraph 4. Bottomley does not disclose shaping the correlation by performing a transformation on the output so that the covariance matrix has the property that the second row is a permutation of the first row. Heikkila discloses a receiver for demodulating the received signal (figure 8, element 46 and paragraph 0106). The output of element 46 is input to element 30. This element shapes the output of the demodulator by minimizing the Mean Square Error (paragraph 0033) that utilizes the rows of a covariance matrix as stated in the abstract. It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the teachings of Heikkila into the apparatus and method of Bottomley. Minimizing the mean squared error of the symbols allows the data to be properly recovered in the receiver. The data will be free of errors and the receiving process will be more efficient.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Burd whose telephone number is (571) 272-3008. The examiner can normally be reached on Monday - Friday, 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin M. Burd
8/13/2005

KEVIN BURD
PRIMARY EXAMINER